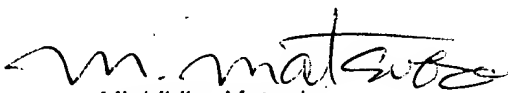
Date: November 20, 2001

Declaration

I, Michihiko Matsuba, President of Fukuyama Sangyo Honyaku Center, Ltd., of 16-3, 2-chome, Nogami-cho, Fukuyama, Japan, do solemnly and sincerely declare that I understand well both the Japanese and English languages and that the attached document in English is a full and faithful translation, of the copy of Japanese Unexamined Patent No. 2000-97700 laid open on April 7, 2000.



Michihiko Matsuba

Fukuyama Sangyo Honyaku Center, Ltd.

SURVEYING APPARATUS

Japanese Unexamined Patent No. 2000-97700

Laid-open on: April 7, 2000

Application No. Hei-10-263842

Filed on: September 18, 1998

Inventor: Koichi KITAKATA

Applicant: Topcon Corp.

Patent Attorney: Shoji MIYOSHI

SPECIFICATION

[TITLE OF THE INVENTION] SURVEYING APPARATUS

[ABSTRACT]

[Theme] Leakage light passing through the space between optical members to be separately disposed is blocked, thereby reducing an optical noise in an optical system.

[Solving means] In a surveying apparatus provided with an optical system including a distance measuring means, an elastic, flexible light-blocking member 22 with which a space is closed is provided in the space between optical members 10 and 20 to be separately disposed among optical members that constitute the optical system, and the light-blocking member blocks

leakage light 19 passing through the space between the optical members, thereby reducing noise light in the optical members and improving measurement accuracy.

[WHAT IS CLAIMED IS;]

[Claim 1] A surveying apparatus provided with an optical system including a distance measuring means, wherein an elastic, flexible light-blocking member with which a space is closed is provided in the space between optical members to be separately disposed among optical members that constitute the optical system.

[Claim 2] The surveying apparatus of Claim 1, wherein the optical members are a dichroic prism used to split distance-measuring light and a received/emitted light splitting mirror that is provided to face the dichroic prism, and a light emitting element that emits a distance-measuring laser beam is disposed on one side whereas a light receiving element that receives reflected light that has been reflected by a target object and has been split by the dichroic prism is disposed on the other side, with the received/emitted light splitting mirror therebetween, and the light-blocking member is disposed between the received/emitted light splitting mirror and the dichroic prism.

[DETAILED DESCRIPTION OF THE INVENTION]

[0001]

[Technical Field of the Invention] The present invention relates to a surveying apparatus, and particularly to a light

wave surveying apparatus for measuring a distance with a light wave.

[0002]

[Prior Art] Fig. 2 shows a main part of the surveying apparatus, which is made up of, like a general surveying apparatus, a leveling part 1 mounted on a tripod, a base part 2 disposed on the leveling part 1, a bracket part 3 disposed rotatably on the base part 2 of a vertical axis, and a telescope part 4 disposed rotatably on the bracket part 3 of a horizontal axis. Further, in an automatic surveying apparatus, the bracket part 3 and the telescope part 4 are rotated and driven by a built-in motor not shown, and can be operated remotely or automatically.

[0003] The telescope part 4 has an optical system for projecting a measuring beam of light and receiving reflection from a target object, and includes a tracking means for detecting, collimating, and tracking a target object on the basis of reflected light that has been received, and a distance measuring means for measuring the distance to the target object.

[0004] Further, the optical system has a dichroic prism, by which reflected light incident on the optical system from the reflection object is split into a waveband for visible light, a waveband for tracking, and a waveband for distance

measurement, and the split measuring beams of light of the waveband for tracking and of the waveband for distance measurement are guided to the tracking means and the distance measuring means, respectively, thus collimating and tracking the target object or measuring the distance to the object target.

[0005] An example of the optical system will be described with reference to Fig. 3.

[0006] An objective lens 5, a focusing lens 6, an erecting prism 7, a focal mirror 8, and an eyepiece 9 are disposed on an optical axis O in this order, and an optical means, preferably a dichroic prism 10, is disposed between the objective lens 5 and the focusing lens 6.

[0007] In the dichroic prism 10, wedged prisms 12 and 13 are attached to the opposite surfaces of a pentagonal prism 11 so as to form a first dichroic mirror surface 14 and a second dichroic mirror surface 15.

[0008] The first dichroic mirror surface 14 transmits visible light and reflects infrared light among incident reflected laser beams of light, and the second dichroic mirror surface 15 transmits distance-measuring light and reflects tracking light. A distance measuring means (not shown) is disposed on the reflection optical axis of the first dichroic mirror

surface 14, and a tracking means (not shown) is disposed on the reflection optical axis of the second dichroic mirror surface 15.

[0009] The tracking light and the distance-measuring light of measuring light emitted from the telescope part 4 are reflected by a target object, and, when the reflected measuring light is entered from the objective lens 5, the measuring light, which is infrared light, i.e., tracking-reflected light and distance-measuring-reflected light are reflected by the first dichroic mirror surface 14, and the visible light passes therethrough. The visible light that has passed therethrough forms an image on the focal mirror 8 by the focusing lens 6, and the formed image is again imaged on the retina of a surveyor together with the scale of the focal mirror 8, thus being collimated.

[0010] Among the infrared light reflected by the first dichroic mirror surface 14, the tracking light is reflected by the second dichroic mirror surface 15, and the distance-measuring light passes therethrough. The tracking reflected light is emitted from the pentagonal prism 11 in a direction that intersects the aforementioned optical axis O, and is received by the tracking means. Based on the result received by the tracking means, the posture of the surveying apparatus is automatically

adjusted so as to set the target object at the center of collimation of a surveying machine.

[0011] The distance measuring means will be described.

[0012] A received/emitted light splitting mirror 20 is disposed facing the wedged prism 13. The crosssectional shape of the received/emitted light splitting mirror 20 is substantially an isosceles triangle, and the apex of this triangle faces the dichroic prism 10, and two surfaces between which the apex is situated serve as reflecting surfaces. A light emitting element 16 is disposed facing one of the reflecting surfaces, and a light receiving element 17 is disposed facing the other reflecting surface. In Fig. 4, 18 designates a reflecting mirror disposed on the target object.

[0013] Distance-measuring light for distance measurement is emitted from the light emitting element 16, thereafter is reflected by one of the reflecting surfaces of the received/emitted light splitting mirror 20, and is projected from the telescope part 4 onto the target object through the dichroic prism 10. A laser beam of tracking light is also projected from the telescope part 4 at the same time. The measuring light is reflected by the reflecting mirror 18 of the target object, and strikes the telescope part 4. The incident measuring light has its distance-measuring light

split by the dichroic prism 10, and the distance-measuring light is reflected by the other reflecting surface of the received/emitted light splitting mirror 20, and strikes the light receiving element 17. Based on the result received by the light receiving element 17, the distance to the reflecting mirror 18 is measured.

[0014] It is impossible to avoid an error of a frame (not shown) that supports the dichroic prism 10 and the received/emitted light splitting mirror 20 and mechanical, optical errors of the dichroic prism 10 and the received/emitted light splitting mirror 20 themselves. Therefore, as shown in Fig. 5 and Fig. 6, for optical axis alignment between the dichroic prism 10 and the received/emitted light splitting mirror 20, the received/emitted light splitting mirror 20 is required to be adjusted positionally with respect to the dichroic prism 10. For this reason, a space G is provided between the dichroic prism 10 and the received/emitted light splitting mirror 20.

[0015]

[Problem to be Solved by the Invention] Since the space G exists between the dichroic prism 10 and the received/emitted light splitting mirror 20 as described above, a part (leakage light) 19 of the laser beam emitted from the light emitting element 16 is reflected by the surface of the dichroic prism 10, and

travels around the received/emitted light splitting mirror 20, and strikes the light receiving element 17. The leakage light 19 that has entered the light receiving element 17 acts as noise light against the reflected light for distance measurement reflected by the received/emitted light splitting mirror 20. A problem has resided in that the power of the reflected light for distance measurement that strikes the light receiving element 17 decreases as the distance to the target object becomes greater, and therefore the S/N ratio between the reflected light for distance measurement and the noise light becomes small, thus exerting an influence upon the accuracy and reliability of distance measurement.

[0016] In consideration of these circumstances, the present invention has been made to block leakage light that passes through the space between optical members required to be separately disposed and thereby reduce an optical noise in an optical system, and has been made to allow a part of a laser beam from a light emitting element to be reflected by the dichroic prism in a light receiving/emitting part of a surveying apparatus so that it does not enter the light receiving element directly, and allow the optical axis alignment of a received/emitted light splitting mirror to be adjusted with respect to the dichroic prism.

[0017]

[Means for Solving the Problem] The present invention is concerned with a surveying apparatus provided with an optical system including a distance measuring means, wherein an elastic, flexible light-blocking member with which a space is closed is provided in the space between optical members to be separately disposed among optical members that constitute the optical system, and wherein the optical members are a dichroic prism used to split distance-measuring light and a received/emitted light splitting mirror that faces the dichroic prism, and a light emitting element that emits a distance-measuring laser beam is disposed on one side whereas a light receiving element that receives reflected light that has been reflected by a target object and has been split by the dichroic prism is disposed on the other side, with the received/emitted light splitting mirror therebetween, and the light-blocking member is disposed between the received/emitted light splitting mirror and the dichroic prism, thus the light-blocking member blocking a leakage beam of light from passing through the space between the optical members, thereby reducing noise light in the optical members and improving measurement accuracy.

[0018]

[Embodiment of the Invention] An embodiment of the present invention will be hereinafter described with reference to the drawings.

[0019] Fig. 1 shows a main part of this embodiment, in which the same symbols are given to the same component as shown in Fig. 4.

[0020] A received/emitted light splitting mirror 20 is disposed facing an incidence/emission surface 21 of the dichroic prism 10. The received/emitted light splitting mirror 20 is disposed so that the apex thereof faces the incidence/emission surface 21, and a light emitting element 16, such as LED, is disposed facing one of two surfaces between which the apex is situated, whereas a light receiving element 17 is disposed facing the other surface.

[0021] A light-blocking member 22 is disposed between the apex of the received/emitted light splitting mirror 20 and the incidence/emission surface 21 so as not to produce a gap therebetween. The light-blocking member 22 is a highly elastic, flexible material, such as rubber or foam rubber (foam polyurethane or foam isobutylene-isoprene rubber).

[0022] The received/emitted light splitting mirror 20 is fixed by combining the optical axis of the received/emitted light splitting mirror 20 with that of the dichroic prism 10 (see

Fig. 5 and Fig. 6). The light-blocking member 22 has a sufficient amount of variation so that a gap does not occur between the received/emitted light splitting mirror 20 and the dichroic prism 10 even if the received/emitted light splitting mirror 20 is positionally adjusted for optical axis alignment.

[0023] A laser beam for distance measurement is emitted from the light emitting element 16, thereafter is reflected by the received/emitted light splitting mirror 20, and is projected onto the target object through the dichroic prism 10. The incident measuring light reflected by the target object has its distance-measuring light split by the dichroic prism 10, and the distance-measuring light is reflected by the received/emitted light splitting mirror 20, and strikes the light receiving element 17. A light-reception signal is input from the light receiving element 17 to an arithmetic part of a distance measuring means (not shown), and the distance to the target object is measured based on the received result.

[0024] Since the space between the received/emitted light splitting mirror 20 and the dichroic prism 10 is completely closed with the light-blocking member 22, leakage light from the light emitting element 16 never directly strikes the light receiving element 17, thus improving the detection accuracy and detection reliability of the reflected light for distance

measurement of the light receiving element 17 and improving the accuracy and reliability of distance measurement.

[0025] Although the blocking of the leakage light between the dichroic prism 10 and the received/emitted light splitting mirror 20 was described in the aforementioned embodiment, it can, of course, be applied to the leakage light between two or more optical members to be separately disposed.

[0026]

[Effect of the Invention] As described above, according to the present invention, a reflection noise in the optical system can be reduced, and therefore an S/N ratio increases, and the present invention produces an excellent effect whereby the distance measurement accuracy and measurement reliability especially at a great distance are improved.

[BRIEF DESCRIPTION OF THE DRAWINGS]

[Fig. 1] An explanatory drawing showing a main part of an embodiment of the present invention, corresponding to section A-A of Fig. 3.

[Fig. 2] An external view of a surveying apparatus.

[Fig. 3] A schematic drawing showing an optical system of the surveying apparatus.

[Fig. 4] An explanatory drawing of a light receiving/emitting part in a distance measuring means, showing section A-A of Fig.

3.

[Fig. 5] An explanatory drawing of optical axis alignment between a dichroic prism and a received/emitted light splitting mirror in the light receiving/emitting part, showing an enlarged view of the main part of Fig. 3.

[Fig. 6] An explanatory drawing of optical axis alignment between the dichroic prism and the received/emitted light splitting mirror in the light receiving/emitting part, showing an enlarged view of the main part of Fig. 3.

[Description of the Symbols]

10 Dichroic prism

16 Light emitting element

17 Light receiving element

19 Leakage light

20 Received/emitted light splitting mirror

21 Incidence/emission surface

22 Light-blocking member

Fig.1

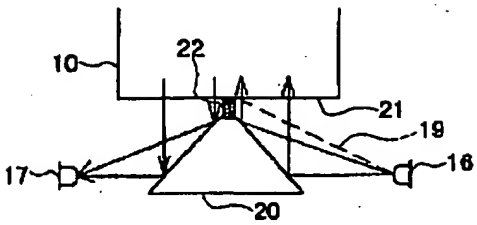


Fig.2

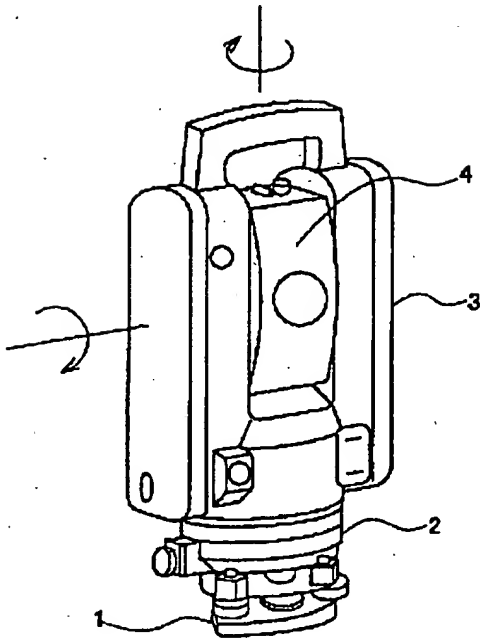


Fig.3

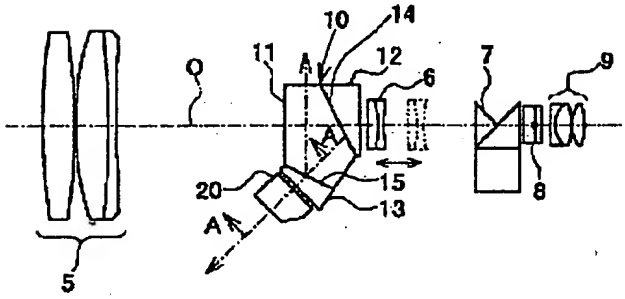


Fig.4

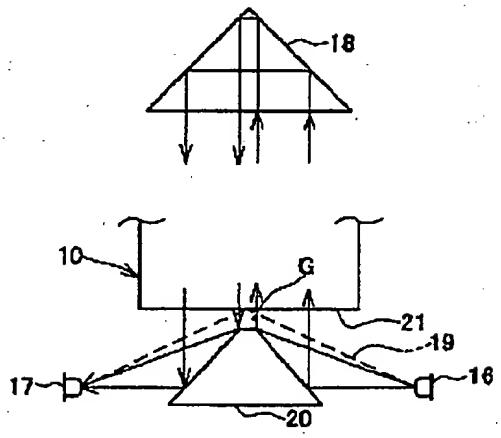


Fig.5

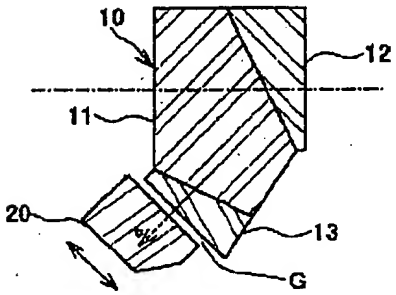
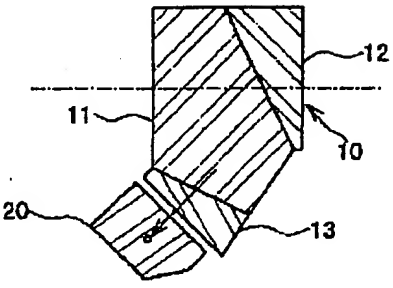


Fig.6



(19)日本国特許庁（ＪＰ）　(12)公開特許公報（A）　(11)特許出願公開番号
特開2000－97700
（Ｐ２０００－９７７００Ａ）
(43)公開日　平成12年４月７日(2000.4.7)

(51)Int.Cl.[7]	識別記号	Ｆ Ｉ	ﾃｰﾏｺｰﾄﾞ (参考)
G01C 15/00		G01C 15/00	L

審査請求　未請求　請求項の数２　ＯＬ　（全４頁）

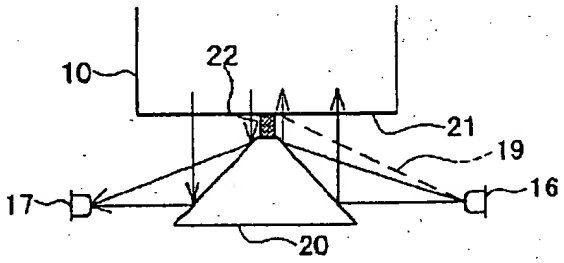
(21)出願番号　特願平10－263842

(22)出願日　平成10年９月18日(1998.9.18)

(71)出願人　000220343
株式会社トプコン
東京都板橋区蓮沼町75番１号
(72)発明者　北潟　公一
東京都板橋区蓮沼町75番１号　株式会社トプコン内
(72)発明者　鈴木　康顕
東京都板橋区蓮沼町75番１号　株式会社トプコン内
(74)代理人　100083563
弁理士　三好　祥二

(54)【発明の名称】測量装置

(57)【要約】
【課題】分離して設ける必要がある光学部材間の間隙を透過する漏光を遮断して光学系内部での光ノイズを低減する。
【解決手段】測距手段を有する光学系を具備する測量装置に於いて、前記光学系を構成する光学部材の内、分離して配設される光学部材１０，２０間の間隙に、該間隙を閉塞する弾性可撓性の遮光部材２２を設けたものであり、該遮光部材が光学部材間の間隙を透過する漏光１９を遮断するので光学部材内部でのノイズ光が低減し、測定精度が向上する。



1

【特許請求の範囲】

【請求項１】　測距手段を有する光学系を具備する測量装置に於いて、前記光学系を構成する光学部材の内、分離して配設される光学部材間の間隙に、該間隙を閉塞する弾性可撓性の遮光部材を設けたことを特徴とする測量装置。

【請求項２】　前記光学部材が測距光を分割するダイクロイックプリズム及び該ダイクロイックプリズムに対峙して設けられた受発光分割ミラーであり、該受発光分割ミラーを挟み一方に測距用レーザ光線を発する発光素子が設けられ、他方に目標対象物から反射され前記ダイクロイックプリズムで分割された反射光を受光する受光素子が設けられ、前記遮光部材は前記受発光分割ミラーとダイクロイックプリズム間に設けられる請求項１の測量装置。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は測量装置、特に光波で距離を測定する光波測量装置に関するものである。

【０００２】

【従来の技術】図２は測量装置の要部を示しており、測量装置は一般の測量装置と同様に三脚に取付けられる整準部１、該整準部１に設けられた基盤部２、該基盤部２に鉛直軸心を中心に回転可能に設けられた托架部３、該托架部３に水平軸心を中心に回転可能に設けられた望遠鏡部４から構成される。更に、自動測量装置では前記托架部３、望遠鏡部４は図示しない内蔵のモータにより回転駆動される様になっており、遠隔で又は自動で操作が可能となっている。

【０００３】前記望遠鏡部４は測定光を照射し、目標対象物からの反射を受光する光学系を有しており、受光した反射光に基づき、目標対象物を検出して視準し追尾する追尾手段、及び目標対象物迄の距離を測定する測距手段を具備している。

【０００４】又、前記光学系はダイクロイックプリズムを有し、反射対象物からの前記光学系に入射した反射光を前記ダイクロイックプリズムにより可視光の波長帯と、追尾用の波長帯と、測距用の波長帯とに分割し、分割された追尾及び測距用の波長帯の測定光はそれぞれ前記追尾手段、測距手段に導かれ、対象目標物に対する視準、追尾或は目標対象物迄の距離測定が行われる。

【０００５】図３により前記光学系の一例を説明する。

【０００６】光軸Ｏ上に対物レンズ５、合焦レンズ６、正立プリズム７、焦点鏡８、接眼レンズ９を順次配設し、前記対物レンズ５と合焦レンズ６との間に光学手段、好ましくはダイクロイックプリズム１０を配設する。

【０００７】該ダイクロイックプリズム１０はペンタ型プリズム１１の対向する面に楔型プリズム１２，１３を貼付け、第１ダイクロイックミラー面１４、第２ダイクロイックミラー面１５を形成したものである。

2

【０００８】前記第１ダイクロイックミラー面１４は入射した反射レーザ光線の内、可視光を透過し、赤外光を反射するものであり、前記第２ダイクロイックミラー面１５は測距光を透過し、追尾光を反射するものである。前記第１ダイクロイックミラー面１４の反射光軸上に測距手段（図示せず）を設け、前記第２ダイクロイックミラー面１５の反射光軸上に追尾手段（図示せず）を設ける。

【０００９】前記望遠鏡部４から照射された測定光の追尾光と測距光は目標対象物で反射され、反射測定光が前記対物レンズ５より入射すると、前記第１ダイクロイックミラー面１４で赤外光である測定光、即ち追尾反射光と測距反射光が反射され、可視光は透過する。透過した可視光は前記合焦レンズ６により前記焦点鏡８で結像し、結像した像は該焦点鏡８のスケールと共に再び測量者の網膜に結像され、視準が行われる。

【００１０】前記第２ダイクロイックミラー面１５では前記第１ダイクロイックミラー面１４で反射された赤外光の内、追尾光が反射され、測距光が透過される。追尾反射光は前記光軸Ｏと交差する方向でペンタ型プリズム１１から射出され、追尾手段で受光される。追尾手段で受光された結果に基づき、測量機の視準中心に目標対象物が位置する様に測量装置の姿勢が自動調整される。

【００１１】前記測距手段について説明する。

【００１２】前記楔型プリズム１３に対峙して受発光分割ミラー２０が配設される。該受発光分割ミラー２０の断面形状は略２等辺三角形であり、該三角形の頂点が前記ダイクロイックプリズム１０に対向し、該頂点を挟む２面が反射面となっている。一方の反射面に対向して発光素子１６が設けられ、他方の反射面に対向して受光素子１７が設けられている。尚、図４中、１８は目標対象物に設けられた反射ミラーである。

【００１３】前記発光素子１６より距離測定用の測距光が発せられ、前記受発光分割ミラー２０の一方の反射面で反射され、前記ダイクロイックプリズム１０を経て前記望遠鏡部４より目標対象物に照射される。又、前記望遠鏡部４からは追尾光のレーザ光線も同時に照射されている。測定光は目標対象物の反射ミラー１８で反射され望遠鏡部４に入射する。入射した測定光は前記ダイクロイックプリズム１０で測距光が分割され、該測距光は前記受発光分割ミラー２０の他方の反射面で反射されて前記受光素子１７に入光する。受光素子１７で受光された結果を基に前記反射ミラー１８迄の距離測定が行われる。

【００１４】ダイクロイックプリズム１０、受発光分割ミラー２０を支持するフレーム（図示せず）の誤差、ダイクロイックプリズム１０、受発光分割ミラー２０自体の機械的、光学的誤差は避けられない。従って、図５、図６に示される様に、前記ダイクロイックプリズム１０

と受発光分割ミラー２０とは光軸合わせの為、該受発光分割ミラー２０はダイクロイックプリズム１０に対する位置の調整が必要である。この為、前記ダイクロイックプリズム１０と受発光分割ミラー２０との間には間隙Ｇが設けられている。

【００１５】

【発明が解決しようとする課題】上記した様に、前記ダイクロイックプリズム１０と受発光分割ミラー２０間には間隙Ｇが存在する為、前記発光素子１６より発せられたレーザ光線の一部（漏光）１９が前記ダイクロイックプリズム１０の表面で反射され、前記受発光分割ミラー２０を回込んで前記受光素子１７に入光する。該受光素子１７に入光した漏光１９は前記受発光分割ミラー２０で反射された測距用反射光に対してノイズ光となる。前記目標対象物の距離が遠くなると受光素子１７に入光する測距用反射光の強度が低下するので、前記測距用反射光と前記ノイズ光とのＳ／Ｎ比が小さくなり、距離測定の精度、信頼性に影響を及ぼすという問題があった。

【００１６】本発明は斯かる実情に鑑み、分離して設ける必要がある光学部材間の間隙を透過する漏光を遮断して光学系内部での光ノイズを低減するものであり、又測量装置の受発光部で発光素子からのレーザ光線の一部が前記ダイクロイックプリズムに反射され、直接受光素子に入光しない様にし、而もダイクロイックプリズムに対して受発光分割ミラーの光軸合せの調整を可能とするものである。

【００１７】

【課題を解決するための手段】本発明は、測距手段を有する光学系を具備する測量装置に於いて、前記光学系を構成する光学部材の内、分離して配設される光学部材間の間隙に、該間隙を閉塞する弾性可撓性の遮光部材を設けた測量装置に係り、又前記光学部材が測距光を分割するダイクロイックプリズム及び該ダイクロイックプリズムに対峙して設けられた受発光分割ミラーであり、該受発光分割ミラーを挟み一方に測距光を発する発光素子が設けられ、他方に目標対象物から反射され前記ダイクロイックプリズムで分割された反射光を受光する受光素子が設けられ、前記遮光部材は前記受発光分割ミラーとダイクロイックプリズム間に設けられる測量装置に係るものであり、前記遮光部材が光学部材間の間隙を透過する漏光を遮断するので光学部材内部でのノイズ光が低減し、測定精度が向上する。

【００１８】

【発明の実施の形態】以下、図面を参照しつつ本発明の実施の形態を説明する。

【００１９】図１は本実施の形態の要部を示しており、図中、図４中で示したものと同一のものには同符号を付してある。

【００２０】前記ダイクロイックプリズム１０の入出射面２１に対峙して受発光分割ミラー２０が配設される。該受発光分割ミラー２０を頂部が前記入出射面２１に対向する様に配設し、該頂部を挟む２面の一方の面に対向して発光素子１６、例えばＬＥＤが設けられ、他方の面に対向して受光素子１７が設けられている。

【００２１】前記受発光分割ミラー２０の頂部と前記入出射面２１との間に間隙が生じない様に遮光部材２２が挟設される。該遮光部材２２は高弾力性で可撓性を有する材料、例えばゴム、発泡ゴム（発泡ポリウレタン、発泡ブチルゴム）等である。

【００２２】前記受発光分割ミラー２０と前記ダイクロイックプリズム１０との光軸を合わせて受発光分割ミラー２０を固定する（図５、図６参照）。前記遮光部材２２は前記受発光分割ミラー２０を光軸合せの為位置を調整しても、受発光分割ミラー２０とダイクロイックプリズム１０間で間隙が発生しない様、充分な変形量を持っている。

【００２３】前記発光素子１６より測距用のレーザ光線が発せられ、前記受発光分割ミラー２０で反射され、前記ダイクロイックプリズム１０を経て目標対象物に照射される。目標対象物で反射され入射した測定光は、前記ダイクロイックプリズム１０で測距光が分割され、該測距光は前記受発光分割ミラー２０で反射されて前記受光素子１７に入光する。該受光素子１７から受光信号が測距手段（図示せず）の演算部に入力され、受光された結果を基に目標対象物迄の距離測定が行われる。

【００２４】前記遮光部材２２により受発光分割ミラー２０とダイクロイックプリズム１０間の間隙を完全に閉塞しているので、前記発光素子１６からの漏光が直接受光素子１７に入光することがなく、受光素子１７の測距用反射光の検出精度、検出の信頼性が向上し、距離測定の精度、信頼性が向上する。

【００２５】尚、上記実施の形態では、ダイクロイックプリズム１０と受発光分割ミラー２０間の漏光の遮光について説明したが、分離して設けられる２以上の光学部材間に実施可能であることは言う迄もない。

【００２６】

【発明の効果】以上述べた如く本発明によれば、光学系内部の反射のノイズを低減することができるので、Ｓ／Ｎ比が向上し、特に遠距離での距離測定精度、測定の信頼性が向上するという優れた効果を発揮する。

【図面の簡単な説明】

【図１】本発明の実施の形態の要部を示す説明図であり、図３のＡ－Ａ断面相当図である。

【図２】測量装置の外観図である。

【図３】該測量装置の光学系を示す概略構成図である。

【図４】測距手段に於ける受発光部の説明図であり、図３のＡ－Ａ断面図である。

【図５】該受発光部に於けるダイクロイックプリズムと受発光分割ミラー間の光軸合せの説明図であり、図３の要部拡大図である。

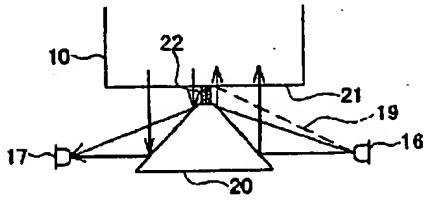
5　　6

【図６】該受発光部に於けるダイクロイックプリズムと受発光分割ミラー間の光軸合せの説明図であり、図３の要部拡大図である。

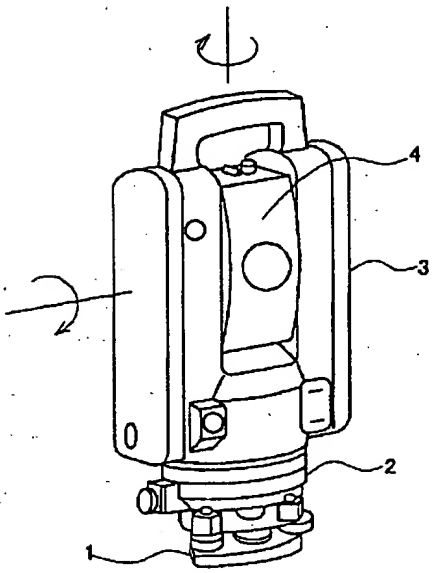
【符号の説明】

１０	ダイクロイックプリズム	１７	受光素子
１６	発光素子	１９	漏光
		２０	受発光分割ミラー
		２１	入出射面
		２２	遮光部材

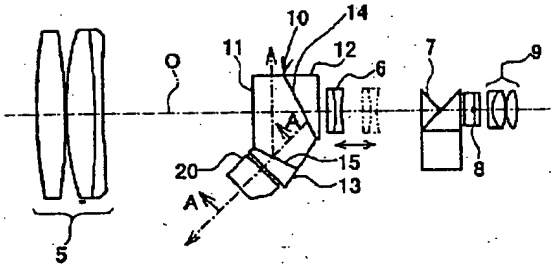
【図１】



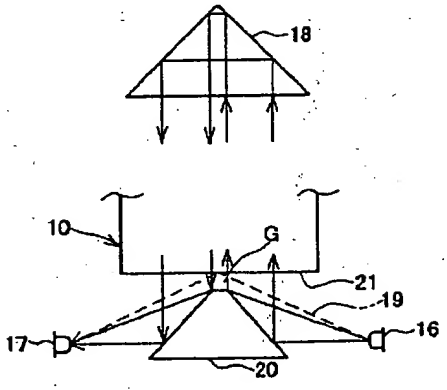
【図２】



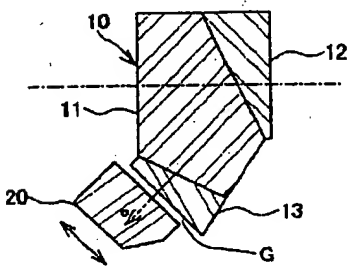
【図３】



【図４】



【図５】



【図６】